



BH 1

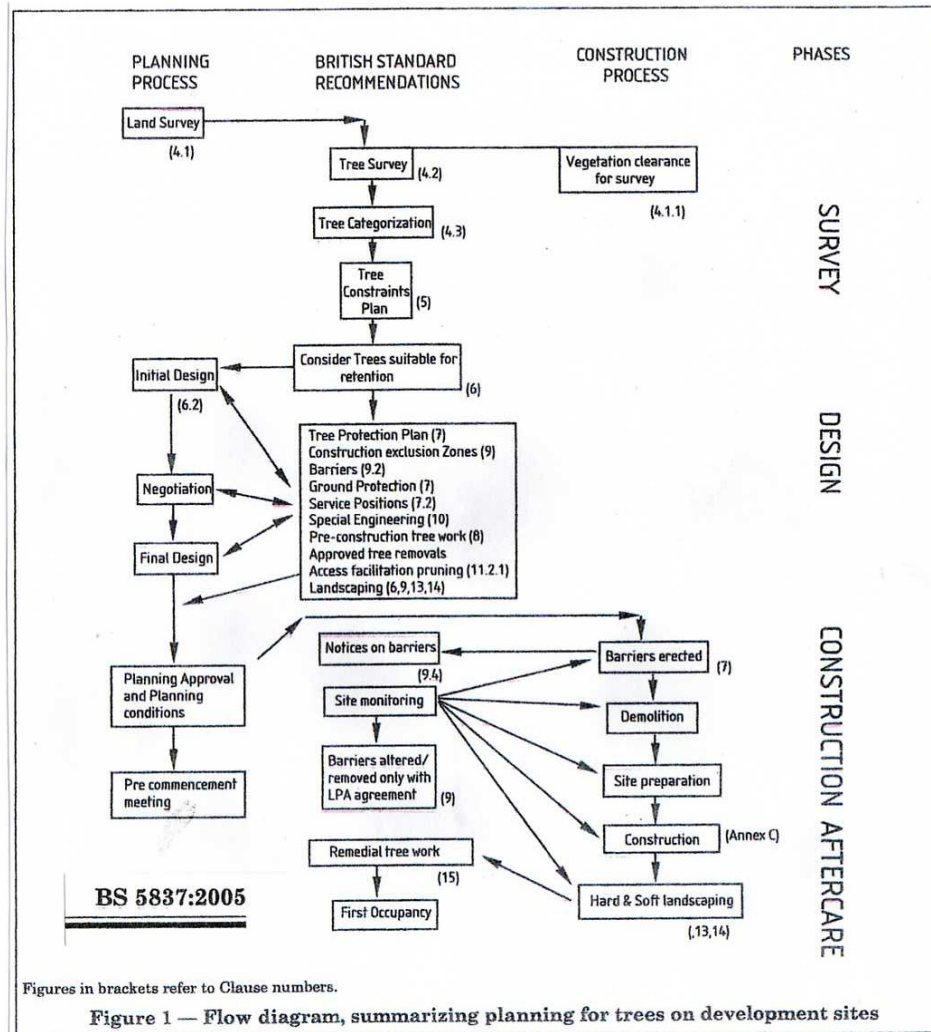
Tree Survey Schedule
(in accordance with Table 1 of BS5837)
with Flow Diagram & Tree Survey Notes

These **TREE SURVEY NOTES** have been prepared in accordance with the recommendations of **British Standard 5837:2005** and define the criteria for pre – development tree surveys.

- Each tree/group has been allocated a unique number (**No.**). Where specifically commissioned small durable numbered metal tags can be applied to each tree/group surveyed.
- The tree species (**Species**) is provided in both English and Latin formats.
- Height assessments (**Ht**) are estimated in metres. This will be adequate for the majority of cases, but where accurate heights become a critical issue it may be necessary to return to site, as a separately commissioned exercise, to collect accurate measurements with the aid of optical instruments.
- Trunk/stem diameters (**Trunk Diam**) are measured in millimetres at 1.5m above ground level and denoted as **S** single stemmed trees or **M** for multi-stemmed trees which are measured immediately above the root flare.
- Radial crown spread assessments (**Brch Sprd**) are estimated in metres from the centre of the trunk/group to each of the four primary points of the compass (**N**-north; **E**-east; **S**-south and **W**-west) in order to achieve a representation of the crown shape which will be recorded on the accompanying tree survey plan. These provide a general guide as to the main bulk outline of a tree/groups crown but are not tape measured dimensions. These would only be undertaken as part of a separately commissioned exercise, where precise dimensions are critical to the project at hand.
- The average ground clearance (**Grd Cl**) is estimated and shown in metres.
- An assessment of a tree/groups age (**Age**) class is made in terms of its site specific maturity as part of the surrounding landscape, taking into account its overall shape and form in that setting, and is recorded thus :-

Y	-	Young tree/group
MA	-	Middle – aged tree/group
M	-	Mature tree/group
OM	-	Over – mature tree/group
V	-	Veteran tree/group
- An assessment of a tree/groups overall physiological condition (**Fm**) is recorded as :-

G	-	Good
F	-	Fair
P	-	Poor
D	-	Dead



- Data on the structural condition (**Condition Comments**) of the tree/group is provided to give an indication of its visual appearance and any significant health and safety issues.
- Details of necessary tree works required at the time of survey is given under the heading – **Preliminary Management Recommendations**
- An estimate of a tree/groups future life expectancy (**Rem Cont**) is made and is recorded thus :-
1-10; 10-20; 20-30; 30-40 or **>40** years.
- The category grading (**Cat**) for each tree/group is assessed according to the criteria provided within **BS5837:2005**. The assessment is made of the tree/group in its current condition and within the environment encountered bearing in mind its suitability for retention as part of any future proposed development; although the exact layout detail of any specific scheme will not be known at the time of surveying. The trees have been classified into one of four categories and colour coded as BS5837 recommends - **R** (dark red); **A** (light green); **B** (mid-blue) and **G** (grey). Please note that the numerical sub-categories which are also applied are for guidance only and do not carry any cumulative or increased value for the tree/group. This colour coding scheme will be applied to all drawings provided.

Table 1 – Cascade chart for tree quality assessment

TREES FOR REMOVAL				
Category and definition	Criteria			Colour on plan
Category R Those in such a condition that any existing value would be lost within 10 years and which should, in current context, be removed for reasons of sound arboricultural management.	- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other R category trees (i.e. where, for whatever reason the loss of companion shelter cannot be mitigated by pruning) - Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline - Trees infected with pathogens of significance to the health and/or safety of other trees nearby (e.g. Dutch Elm Disease), or very low quality trees suppressing adjacent trees of better quality			Dark Red
TREES TO BE CONSIDERED FOR RETENTION				
	Criteria – Subcategories			
	1	2	3	
Category A – Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particularly visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green
Category B – Those of moderate quality and value: in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition(e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating 3than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	Mid Blue
Category C – Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	Grey
Note: Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation				



BJH.0574

TREE SURVEY SCHEDULE

Client : PMC Construction

Site Location : Mary Rose House, Woolston Road, Havant

Surveyor : Bernie Harverson *M.Arb.*

Date Surveyed : 24th April 2012

No	Species	Ht m	S or M	Trunk Diam mm	Brch Sprd m	Grd Cl m	Age	F	Condition Comments	Preliminary Management Recommendations	Rem Cont yrs	Cat
Grp 1	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	4	M	250	N4 E4 S4 W4	0	M	F	Ivy smothering throughout the crowns of some trees-crown shapes dictated by group pressures – merged crown grouping-small diameter deadwood throughout-Brambles smothering the crowns of some trees	Remove all Brambles and Ivy	30-40	B2
1	Weeping Willow <i>Salix babylonica</i>	16	S	660	N8 E6 S9 W9	0	M	G	Roots exposed and mower damage noted-bifurcated at 2m above ground-small diameter deadwood throughout and ground under canopy is strewn with dead branches- some major dead branches	Remove all dead wood	>40	A1
2	Silver Maple <i>Acer saccharinum</i>	16	S	560	N9 E7 S12 W7	2	M	F	Roots exposed and mower damage noted-multi-stemmed at 2m above ground level-some dieback-small diameter deadwood throughout-previously heavily reduced and reshaped on east side only to clear garden overhang-dead branches strewn beneath canopy	Remove all dead wood	>40	B1
3	Flowering Cherry <i>Prunus</i> species	15	S	210	N6 E6 S1 W1	1.5	MA	P	Contorted stem and suppressed to south side and dominated by Maple-cavities and decay in old wounds at ground level around trunk-fungal decay noted at one location	Fell to ground level because of decay and to benefit T2	0-5	R
Grp 2	Broad Leaved Cockspur Thorn <i>Crateagus 'Prunifolia'</i>	3 to 4	S / M	160 to 180	N3 E3 S3 W3	1	MA	F	Suckers around bases of most trees where the rootstock of Hawthorn is trying to establish itself	Remove basal suckers and remove Brambles	30-40	B2
4	Silver Maple <i>Acer saccharinum</i>	18	S	650	N7 E8 S8 W7	1.5	M	F	Roots exposed and mower damage noted-suppressed to the northeast side by tree 5 – small diameter deadwood throughout-storm damaged and broken branches and hangers	Remove small diameter dead wood along with any storm damaged and hanging branches	>40	A1
5	Weeping Willow <i>Salix babylonica</i>	16	S	450	N5 E5 S6 W6	0	M	F	Roots exposed and mower damage noted- suppressed by trees around it-small and large diameter deadwood present with small dead branches strewn below canopy-a memorial tree with a plaque against it-has been forced to grow in a more upright form than would be typical for this species	Remove all dead wood	30-40	B1
6	Flowering Cherry <i>Prunus</i> species	12	S	550	N7 E8 S8 W7	1.5	M	G	Roots exposed and significant mower damage noted-multi-stemmed at 2m above ground-tight forks with included bark-small and large diameter deadwood present-tarmac path has been disrupted by root action to east side	Remove all dead wood	30-40	A1

Grp 3	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	2 to 3	M	200	N- E- S- W-	0	Y	F	Crown shape dictated by group pressures and merged crowns within grouping-clipped as a formal hedge line in places	No works required at the time of survey	20-30	B2
Grp 4	Norway Maples <i>Acer platanoides</i> <i>x 29 of</i>	7 to 10	S	200 to 250	N4 E4 S4 W4	2	Y	F	Crown shape dictated by group pressures and merged crowns within grouping-some dieback noted and some trees are weaker than others within the line-small diameter deadwood throughout-linear screening shelterbelt of trees	Remove small diameter dead wood	30-40	B2
7	Grey Sallow <i>Salix cinerea</i>	7	S	220	N4 E4 S4 W4	1.5	MA	P	Multi-stemmed at 2m above ground-tight forks with included bark-previously heavily reduced and reshaped-growing hard up against the building-low branches touch the roof and guttering	No works required at the time of survey	10-20	C1
8	Whitebeam <i>Sorbus aria</i>	7	S	350	N4 E3 S4 W4	1	MA	G	Multi-stemmed at ground level-good shape and form and sound and healthy	No works required at the time of survey	30-40	A1
9	Whitebeam <i>Sorbus aria</i>	9	S	480	N6 E6 S6 W5	1	M	G	Ivy smothering throughout crown- good shape and form and sound and healthy	Recommend severance of the Ivy	30-40	A1
10	Silver Maple <i>Acer saccharinum</i>	16	S	500	N7 E6 S8 W7	3	M	G	Roots exposed and mower damage noted-car park has been created within 2m of trunk on north side-small diameter deadwood throughout	No works required at the time of survey	>40	A1
Grp 5	Silver Maples <i>x</i> 5 Weeping Willow <i>x</i> <i>1</i>	16	S	400 to 600	N10 E5 S5 W8	3	M	F	Crown lifted to 4m above ground and there are small cavities in old pruning wounds- crown shape dictated by group pressures and merged crowns within grouping- small and large diameter deadwood present-Maples enclose the Willow giving it a more upright habit than would be the norm for the species	Remove all dead wood	>40	B2



BH 2

Tree Root Protection Area Schedule
(in accordance with Table 2 of BS5837)

ROOT PROTECTION ZONE/AREA SCHEDULE

Client : PMC Construction

Site Location : Mary Rose House, Woolston Road, Havant

Tree No.	Tree Species	Grade	Single or Multi	Diam. mm	BS5837:2005 Table2-Radial Protect. Zone m	BS5837:2005 Table2-Root Protect. Area m ²	Is An Offset Required To Cater For Existing Rooting Pattern Restrictions
Grp 1	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	B2	M	250	2.5	19.6	NO – mutual suppression within the group but free rooting to outer edges
1	Weeping Willow <i>Salix babylonica</i>	A1	S	660	7.9	197.1	NO – free rooting to all directions
2	Silver Maple <i>Acer saccharinum</i>	B1	S	560	6.7	141.9	NO – free rooting to all directions
3	Flowering Cherry <i>Prunus</i> species	R	S	210	n/a	n/a	NO – this tree would be removed for sound arboricultural reasons regardless of any redevelopment proposals
Grp 2	Broad Leaved Cockspur Thorn <i>Crateagus 'Prunifolia'</i>	B2	S / M	160 to 180	1.9 1.8	11.6 10.2	NO – free rooting to all directions
4	Silver Maple <i>Acer saccharinum</i>	A1	S	650	7.8	191.2	NO – free rooting to all directions
5	Weeping Willow <i>Salix babylonica</i>	B1	S	450	5.4	91.7	NO – free rooting to all directions
6	Flowering Cherry <i>Prunus</i> species	A1	S	550	6.6	136.9	NO – free rooting to all directions
Grp 3	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	B2	M	200	2.0	12.6	NO – mutual suppression within the group but free rooting to outer edges
Grp 4	Norway Maples <i>Acer platanoides</i> x 29 of	B2	S	200 to 250	2.4 3.0	18.1 28.3	NO – mutual suppression within the group but free rooting to outer edges
7	Grey Sallow <i>Salix cinerea</i>	C1	S	220	2.7	22.0	YES – the building footings will have affected the rooting pattern
8	Whitebeam <i>Sorbus aria</i>	A1	S	350	4.2	56.0	NO – free rooting to all directions

9	Whitebeam <i>Sorbus aria</i>	A1	S	480	5.8	104.3	NO – free rooting to all directions
10	Silver Maple <i>Acer saccharinum</i>	A1	S	500	6.0	113.1	NO – free rooting to all directions
Grp 5	Silver Maples x 5 Weeping Willow	B2	S	400 to 600	4.8 7.2	72.4 162.9	NO – mutual suppression within the group but free rooting to outer edges



BH 3

Tree Constraints Plans

BH01/02



BH 4

Pre-Development Facilitation Tree Works Schedule

TREE WORK SPECIFICATION

Client : PMC Construction

Site Location : Mary Rose House, Woolston Road, Havant

Attention is drawn to the fact that some mature trees could provide suitable habitat for bird nesting (ivy and cavities) and bat roosting (ivy, branch cracks and cavities) and this might at certain times of year influence and possibly restrict the form of management which can be applied. Given the legal constraints imposed by the Habitat Regulations and the Wildlife and Countryside Act this may necessitate expert ecological advice being sought before proceeding with the recommendations.

No	Species	Tree Works Recommended
Grp 1	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
1	Weeping Willow <i>Salix babylonica</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
2	Silver Maple <i>Acer saccharinum</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
3	Flowering Cherry <i>Prunus</i> species	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
Grp 2	Broad Leaved Cockspur Thorn <i>Crateagus 'Prunifolia'</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
4	Silver Maple <i>Acer saccharinum</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
5	Weeping Willow <i>Salix babylonica</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
6	Flowering Cherry <i>Prunus</i> species	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
Grp 3	Himalayan Cotoneasters <i>Cotoneaster frigidus</i>	<u>Northern End of line ONLY</u> - Fell to ground level in a controlled manner - Grind out the stumps to prevent major damage to retained trees nearby - Remainder of grouping will need to be pruned back to clear the development and permit scaffold erection
Grp 4	Norway Maples <i>Acer platanoides</i> x 29 of	<u>Northern End of line ONLY</u> - Fell to ground level in a controlled manner - Grind out the stumps to prevent major damage to retained trees nearby - Remainder of grouping will need to be pruned back to clear the development and permit scaffold erection - Plus where appropriate some of the lowest branches will need to be removed to raise the crowns and allow more light to penetrate beneath them (under arboricultural experts supervision)

7	Grey Sallow <i>Salix cinerea</i>	- Fell to ground level in a controlled manner - Grub out the stump and primary roots
8	Whitebeam <i>Sorbus aria</i>	- Fell to ground level in a controlled manner - Grind out the stump to prevent major damage to retained tree nearby
9	Whitebeam <i>Sorbus aria</i>	Shorten back the lateral growth to the north side ONLY - to facilitate scaffold erection and clear the building line – all cuts being made adjacent to living growth points
10	Silver Maple <i>Acer saccharinum</i>	Remove major deadwood only
Grp 5	Silver Maples x 5 Weeping Willow	Remove major deadwood only



BH 5

Tree Protection Plan

BH 03

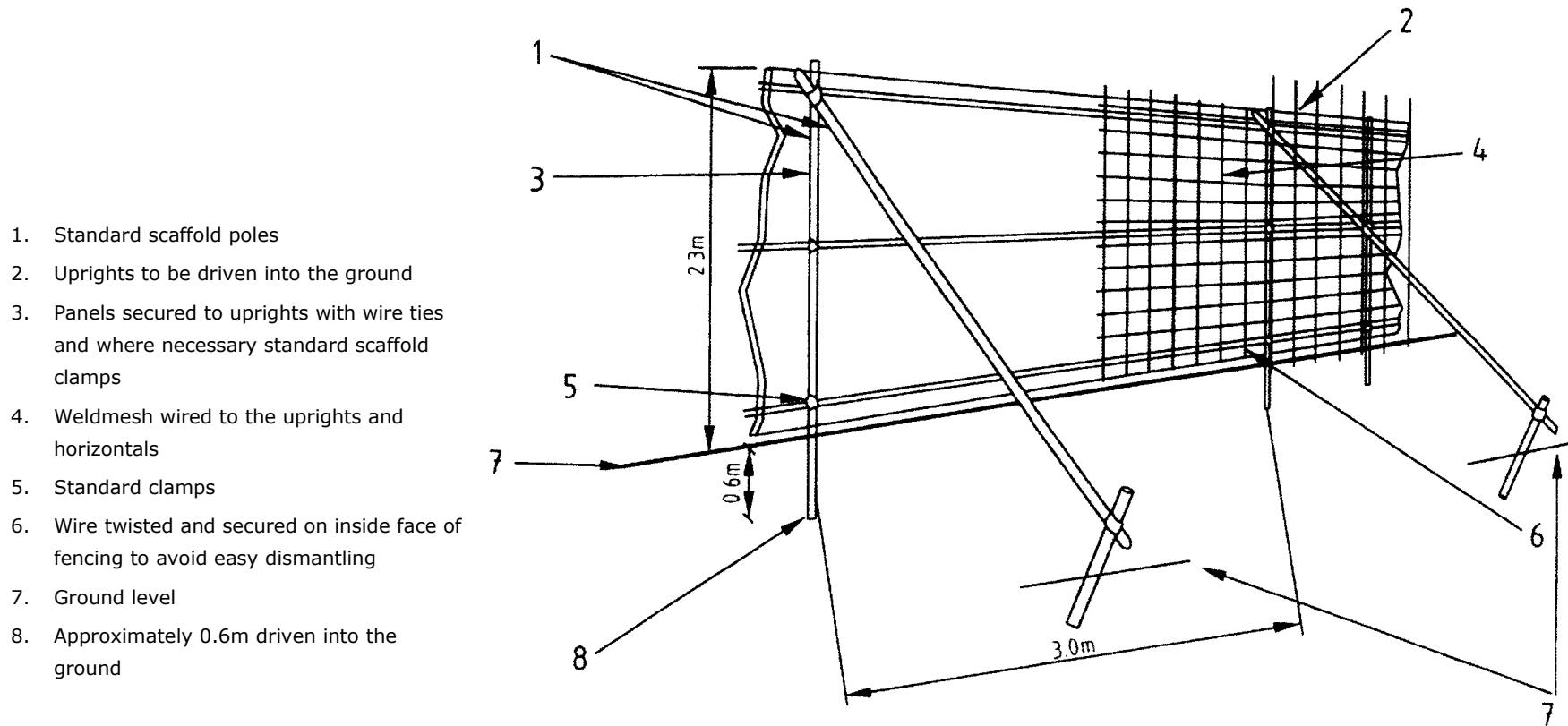


Figure 2 - Protective Barrier
Extract taken from BS5837:2005

9.2 Barriers

9.2.1 Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.

9.2.2 In most cases, barriers should consist of a scaffold framework in accordance with Figure 2. comprising a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Onto this, Weldmesh panels should be securely fixed with wire or scaffold clamps. Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used.

NOTE The above is preferred because it is readily available, resistant to impact, can be re-used and enables inspection of the protected area.

9.2.3 It may be appropriate on some sites to use temporary site office buildings as components of the tree protection barriers.

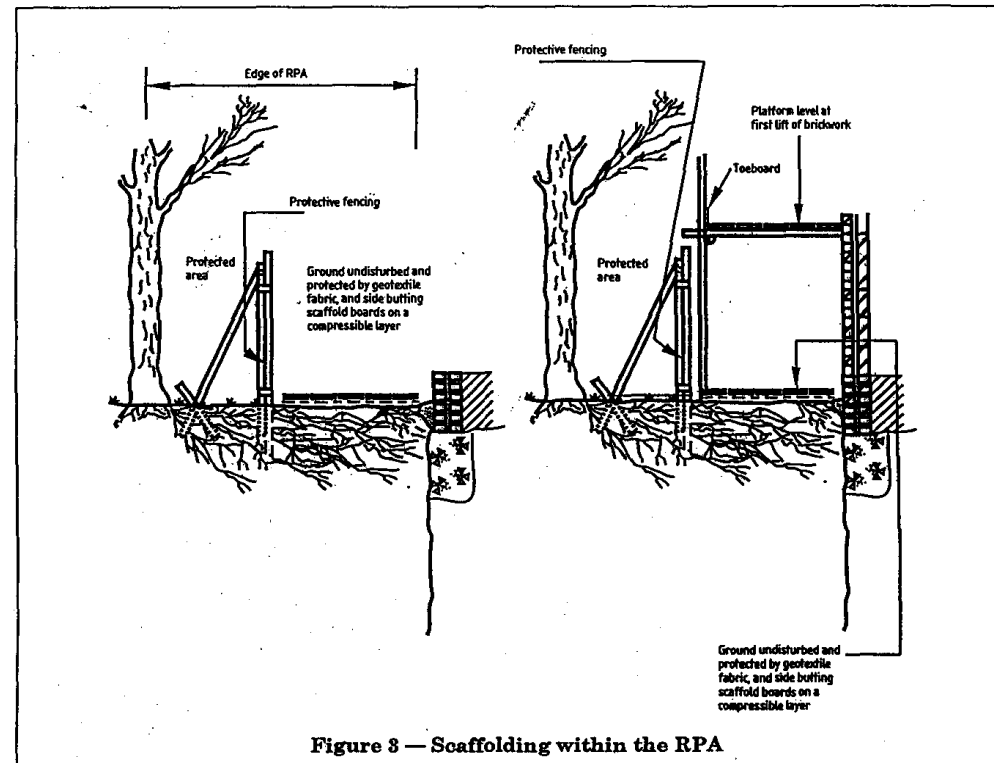


Figure 3 — Scaffolding within the RPA

Extract taken from BS5837:2005

9.3 Ground Protection

9.3.1 Where it has been agreed during the design stage, and shown on the tree protection plan, that vehicular or pedestrian access for the construction operation may take place within the root protection area (RPA), the possible effects of construction activity should be addressed by a combination of barriers and ground protection. The position of the barrier may be shown within the RPA at the edge of the agreed working zone, but the soil structure beyond the barrier to the edge of the RPA should be protected with ground protection.

9.3.2 For pedestrian movements within the RPA the installation of ground protection in the form of a single thickness of scaffold boards on top of a compressible layer laid onto a geotextile, or supported by scaffold, may be acceptable (see Figure 3).

9.3.3 For wheeled or tracked construction traffic movements within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of proprietary systems or reinforced concrete slabs (see 11.8 and 11.9).

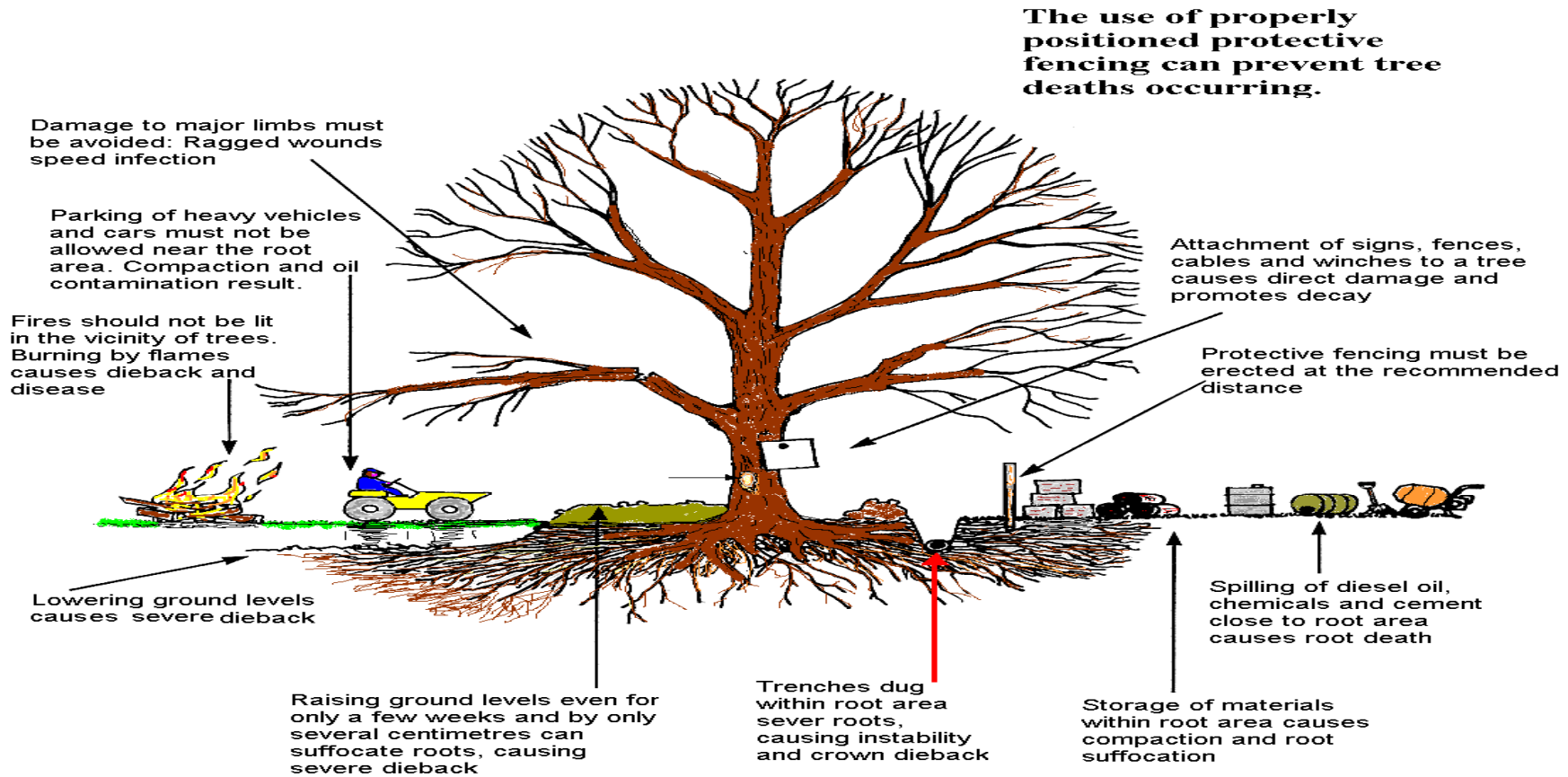
TREE PROTECTION AREA

KEEP OUT

- **NO EXCAVATION OR TRENCHING WORKS PERMITTED**
- **NO STORAGE OF PLANT OR MATERIALS PERMITTED**
- **NO VEHICLE ACCESS PERMITTED**
- **NO FIRE LIGHTING PERMITTED**
- **NO CHEMICAL HANDLING**
- **VEHICLES WORKING CLOSE TO PROTECTIVE FENCING MUST AVOID CONTACT WITH OVERHANG FROM TREE CANOPY**

Common causes of Tree Death

BJH.0574



Please use copies of this as an on-site poster for personnel





BH 6

BS 5837:2005 Extracts

Section15 & NJUG 10 Extracts

Extract taken from BS5837:2005 & NJUG 10**15 Post development management****15.1 Existing trees**

15.1.1 Trees growing on a site before development takes place may, if adversely affected, be in decline over a period of several years before they die. This varies greatly depending on the age, species and condition of the tree, the soil conditions, climate and the extent of damage incurred during development. A programme of inspections and necessary work for the treatment of symptoms as they develop should be drawn up in conjunction with an arboriculturist. This programme may include recommendations for frequency of inspection and/or beneficial tree work and should take the form of an arboricultural management plan.

15.1.2 Where the trees in question are protected by planning controls, the planning authority should be informed and any necessary agreements obtained prior to such work.

15.1.3 Prior to handover, following completion of development, the arboriculturist should look for signs of intolerance to change in conditions and the effect of the development and any accidental damage to identify the need for further tree works in addition to those originally specified at the beginning of the development process.

15.1.4 An arboriculturist, should consider appropriate cultural operations. These may include irrigation, or measures to enhance the soil structure and organic nitrogen levels in the soil.

15.1.5 Where the development design incorporates the need for active management intervention following the completion of construction works, a tree or landscape management plan should be prepared and a copy supplied to all parties who may have an interest in the future management of the site or parts of it.

15.2 New plantings

Maintenance of newly planted trees is of particular importance during the critical establishment period, of at least two years and may, where required by planning conditions, be five years or more following planting. A detailed maintenance schedule covering the establishment period should be prepared in conjunction with the landscape design proposals and appropriate arrangements made for its implementation.

NJUG 10 - NATIONAL JOINT UTILITIES GROUP**2. HOW ROOTS ARE DAMAGED**

2.1 Contrary to popular belief, the root system of a tree is not a mirror image of the branches, nor is there usually a 'tap root'. The majority of the root system of any tree is in the surface 600mm of soil, extending radially in any direction for distances frequently in excess of the tree's height. Excavation or other works within this area are liable to damage roots.

The root system

2.2 The base of the trunk typically flares out in buttresses, with these extending into the main lateral structural roots. These rapidly subdivide into the mass of smaller roots which serve to anchor the tree into the soil, and to conduct water and nutrients. Even a short distance (3m) from a large mature tree, most roots will be less than 10mm in diameter, but these may extend to well beyond the branch spread of the tree. A mass of fine roots, less than 1mm diameter, develop off all parts of this root system. These fine roots absorb the water and nutrients which are essential for the growth of the tree.

2.3 The main structural roots (close to the trunk) develop as the tree grows in response to the need for the tree to have physical stability. Beyond these major roots, root growth is influenced by the availability in the soil of water, air and nutrients. The cultivation of soil provides ideal conditions for root growth. Services are often cooler than surrounding soil, encouraging moisture within the soil to condense on the surface, thereby encouraging roots to grow close to the service. For all these reasons, root growth is often most prolific within the backfilled trench and in the soil around the services. The variability of soil conditions and the presence of obstacles to root growth results in a very variable and unpredictable distribution of the roots within the general guidance in para 2.1.

Types of damage

2.4 Root systems can be damaged by:-

- The severance of a root, for example by trenching, which will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving the fine roots over a wide area. The larger the root severed, the greater the impact on the tree.
- Damage to the bark on the root. The bark protects the root from decay, and is also essential for further root growth. It is loosely attached and easily damaged. If damage to the bark extends around the whole circumference, the root beyond that point will be killed.
- Compaction of the soil. Compaction which is avoidable may occur from storage of material or passage of heavy equipment over the roots. This can restrict or even prevent gaseous diffusion through the soil, and thereby asphyxiate the roots. The roots must have oxygen for survival, growth and effective functioning.
- Alterations in soil level. Lowering the level will strip out the mass of roots near the surface. Raising levels will have the same effect as soil compaction.
- Incorrect application of herbicide.
- Spillage of oils or other harmful materials.

2.5 If roots are damaged:-

1. close to the trunk, the anchorage and stability of the tree can be adversely affected.
2. anywhere along their length, all of the fine roots which they serve will be destroyed.

Damage to the fine roots by severance of a main root, or by compaction or alteration in levels, will prevent these fine roots from absorbing the water and nutrients which are essential for the well-being and growth of the tree. The effects of damage from different causes, for instance by successive excavations for different services, or by excavation in one part and compaction in another part of the system, will be cumulative.

2.6 If the root system is damaged, new roots must develop to sustain the tree. These may develop from damaged root or by increased growth of other parts of the system. It may take years to replace all the lost roots. Vigorous young trees are the most likely to be capable of rapid root regeneration, but mature trees find it very difficult to recover from major root damage, if at all. While roots may regenerate, they will not necessarily provide their original anchorage.

2.7 Trees with damage may not show any immediate symptoms. If the root system is capable of rapid regeneration the tree may recover without any noticeable ill-effects, but usually the symptoms will take several years to develop. Such symptoms may range from only minor branch dieback to deterioration and ultimate death of the tree, dependant on the severity of damage and the ability of the roots to regenerate.

2.8 There is frequently a need for operational land (e.g. substations) to be kept clear of weed growth for safety and as a fire precaution. Herbicides provide an efficient method of killing both herbaceous and woody weeds. There are several types of herbicide with different modes of action and persistence. The most attractive chemicals are those that can be applied to the ground, usually as a granule, and which remain active in the soil for long periods. The wide-ranging root system of a tree may extend into the operational land from adjoining properties, and may absorb some types of herbicides which have been applied to the ground. Material absorbed in one part of the root system can kill the whole tree.

2.9 Other materials which can leach into the soil can also damage the root system. For instance, oil spilled into the soil is broken down by soil bacteria which deplete the soil of oxygen and so asphyxiate the roots. Other materials may have a direct toxic effect on roots.

4 HOW TO AVOID DAMAGE TO TREES

4.1 This section gives general guidance on methods of work to minimise damage to trees which should be adopted by utilities. The local authority (or for privately owned trees, the owner or his advisor), should be informed about planned work at an early stage prior to commencement.

4.2 Wherever trees are present, precautions should be taken to minimise damage to the root system. As the shape of the root system is unpredictable, there should be careful control and supervision of any excavation, particularly if this involves digging through the surface 600mm where the majority of roots develop.

4.3 The precautions advocated in this section are applicable to any excavations or other works occurring within a distance from the tree equal to 4 times the circumference of the trunk (circumference measured around the trunk at a height of 1.5m above ground level; distance measured from the centre of trunk to nearest part of any excavation or other work). This area around the trunk is referred to as “the precautionary area” hereafter.

4.4 Although, ideally, services should be diverted or re-aligned outside the precautionary area, it is recognised that this will not always be practicable. Where works are required for the laying or maintenance of any service within the precautionary area, there are various techniques to minimise the damage. The appropriate method of laying will depend on the circumstances, such as:

- scope of the works (one off repair, or part of an extensive operation)
- degree of urgency (for restoration of supplies)
- soil conditions
- amenity value of tree
- cost

Acceptable techniques in order of preference are:-

1. **Trenchless**
2. Broken trench – hand dug
3. Continuous trench – hand dug

Excavation of open trenches by machine is totally unacceptable within the precautionary area.

4.5 **Trenchless**

4.5.1 Wherever possible trenchless techniques should be used. The pit excavations for starting and receiving the machinery should be located outside the precautionary area.

4.5.2 IN order to avoid damage to roots by the **mole**, it is recommended that the depth of run should be below 600mm. Techniques involving external lubrication of the mole with materials other than water (e.g. oil, bentonite) should be avoided, unless precautions are taken to ensure that there is no contamination of the soil within 600mm of the surface within the precautionary area.

4.6 **Broken Trench**

4.6.1 This technique combines hand dug trench sections with trenchless techniques. If excavation is unavoidable, it should be limited to practical access and installation around/below the roots. The trench is excavated by hand with precautions taken as for continuous trench below. Open sections of the trench should only be long enough to allow access for linking to the next section. The length of sections will be determined by local conditions, especially soil texture and cohesiveness, as well as the practical needs for access. In all cases the open sections should be kept as short as possible.

4.7 **Continuous Trench**

4.7.1 The object of the exercise is to use manual excavation so as to retain as many roots as possible, bearing in mind the need for working space, access to the service in question and room to install the new service. Hand digging needs to be undertaken with great care and for this reason is likely to require closer supervision than normal operations and an understanding by all operatives and staff as to exactly what is expected.

4.7.2 After careful removal of the hard surface material, digging should proceed with hand tools. All roots greater than 25mm diameter should be retained and worked around. Where clumps of smaller roots (including fibrous roots) are found these should also be retained. During the excavation great care should be taken to minimise damage to retained roots, including the bark around the roots. Roots with a diameter in excess of 25mm must not be severed without the advice of the owner of the tree or the local authority arboriculturist, who should respond within one working day. If severance is unavoidable, roots must be cut back using a sharp tool (as listed below), leaving the smallest wound.

Suggested tools required: fork, breaker bar, secateurs, handsaw (folding, silky or bow saw), post hole shoveller and hand fork and trowel.

4.8 **Backfilling**

4.8.1 Any reinstatement must comply with the requirements of street works in Great Britain must comply with the requirements of the code of practice approved under the New Roads and Street Works Act 1991 (Specification for the Reinstatement of Openings in Highways). Without prejudice to the requirements of this code as to the specification of materials to be used and the standards of workmanship to be observed, backfilling of any excavation should be carefully carried to avoid direct damage to the retained roots and excessive compaction of the soil around them.

4.8.2 The backfill should, where possible, include the placement of an inert granular material mixed with top soil or sharp sand (not builders sand) around the retained roots. This should allow the soil to be compacted for resurfacing without damage to the roots, and should secure a local aerated zone enabling the root to survive in the longer term.

4.8.3 Backfilling outside the highway limits should be carried out using the excavated soil. This should not be compacted but lightly “tamped” and usually left slightly proud of the surrounding surface to allow natural settlement. Other materials should not be incorporated into the backfill.

4.8.4 Fine roots are vulnerable to desiccation once they are exposed to the air. Larger roots have a bark layer which provides some protection against desiccation and temperature change. The greatest risk to these roots occurs when there are rapid fluctuations in air temperature around them, e.g. winter diurnal temperatures. It is important, therefore, to protect exposed roots where a trench is to be left open overnight when there is a risk of frost. In winter, before leaving the site at the end of the day, the exposed roots should be wrapped with dry sacking. This sacking must be removed before the trench is backfilled.

4.10 **Special Considerations when planning service routes**

4.10.1 The potential for future conflict with trees can be reduced at the stage of initial planning approval by the appropriate alignment of services and the provisions for future tree and shrub planting. Appropriate and separate space should be provided for each. Local authorities should liaise with developers.

4.10.2 If planning requirements and site constraints dictate that trees (existing or to be planted) and services share the same area, consideration should be given to increasing the depth of services, if possible to a minimum of 600mm, and to laying the service in ducts which will resist root penetration but allow replacements to be laid without extensive excavation. As this may incur additional costs, allowance must be made for these costs and the responsibility for meeting them at the planning stage.

4.10.3 When laying new services or replacements, to avoid risk of future direct damage, allowance should be made for future root growth.

4.10.4 Services laid in clay or peat should be constructed to tolerate movements associated with swelling or shrinking of the subsoil caused by root activity. Special precautions for differential movement should be incorporated where services join rigid structures founded at a different depth to the service.



BH 7

Qualifications & Experience



QUALIFICATIONS AND EXPERIENCE

- My name is Bernie Harverson and I am a self employed independent arboricultural consultant in private practice. I take instructions primarily in the South of England but also on occasions work nationwide and abroad and have offices at : –
3 Foxcombe Cottages, South Harting, West Sussex GU31 5PL and also at Cedar Court, 5 College Street, Petersfield GU31 4AE
- I hold the following arboricultural qualification - **Master of Arboriculture** (Royal Forestry Society – 1976)
- I have over **forty** years of practical and managerial experience in the arboricultural industry including periods in both the public and private sectors.
- My Local Government sector experience comprises one year as a tree surgeon with Brighton Parks and nine years spent in Arboricultural Officer posts with both Westminster City Council and Portsmouth City Council
- My past practical experience in the private sector includes two years at Tilhill Forest Nursery and over ten years for various companies as a Climbing Arborist/Tree Surgeon.
- Managerial work in the private sector includes two years as manager of Beechings tree surgery company and twelve years with CBA Trees as an Arboricultural Consultant.
- As an independent self employed Arboricultural Consultant I now provide a comprehensive range of services including :-
tree surveys, appraisals, assessments and inspections with particular reference to planning and development and tree safety audits with a service offered as a climber to undertake full climbing inspections to better understand the condition of a given tree before prescribing a management strategy.
 - I also undertake litigation work appearing as an Expert Witness in Court Actions and at Planning Appeals, Hearings and Public Local Inquiries.

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